TRANSPORTATION INDICATORS

Introduction

I. Purpose of Transportation Indicators

The King County Countywide Planning Policies (CPPs) describe a regional vision of growth and development; land use, transportation, and other plan elements are to be coordinated to achieve this overarching vision. The CPPs cover a twenty year time span, during which time growth and development are expected to occur according to the policies in the plan so that the regional vision may be realized. The CPPs call for monitoring the achievement of the key outcomes and identifying trends that support or detract from them.

The key outcomes of the CPPs transportation policies are to:
- Enhance Transportation and Land Use Linkages
- Increase the Availability of Modes other than Single Occupant Vehicle
- Reduce Commercial Traffic Congestion
- Protect and Improve the Transportation Infrastructure

The Transportation Indicators show changes over time in mobility-related phenomena as growth and change occur, and the goals of the CPPs are realized. The goals include an increase in regional mobility and progress towards a multimodal transportation system.

By reporting on parameters that are related to the linkage between transportation and land use development, and on the transportation choices made by King County residents, the Benchmark Report will help the Growth Management Planning Council (GMPC) evaluate regional progress toward the achievement of the Countywide Planning Policies' vision. The Benchmark Committee of the GMPC selected these Indicators as the first effort to report meaningful transportation data to the GMPC as it relates to the achievement of the Countywide Planning Policies.

II. Key Observations*

The Indicators report the latest available data, and also establish a historical trend. The Countywide Planning Policies were adopted in 1994, and most local Comprehensive Plans were adopted in 1994 or later, hence the data should not be expected to reflect the full impact of the policies.

Indicator #41 **Percent of residents who commute one-way within 30 minutes.**

- About 79% of Puget Sound commuters travel less than thirty minutes to or from work.
- Because commute times have not yet reached extremes, residential location will not be greatly affected by transportation conditions.

Indicator #42 **Transit trips per person.**

- This indicator has fluctuated over the last ten years, with per capita ridership reaching a high in 1989, and a low in 1994. It increased again from 1994 to 1997, but leveled off in 1998.
- Transit ridership for 1998 was 48.2 trips per person.

Indicator #43 **Percent of residents who walk or use transit, bicycles or carpools as alternatives to the single occupant vehicle.**

* *See Section V for definitions of terms.*

- In 1997 the split in the mode of transportation for all day travel was: Transit: 5.7%; High Occupancy Vehicle (HOV)/Carpool: 33%; Non-Motorized/Other: 6.9%; Single Occupancy Vehicle (SOV): 54.4%.
- The high proportion of trips using the HOV mode (33% in 1997) is characteristic of daily travel, when family members frequently accompany the adult driver on shopping, recreation, and other trip types.
- The U.S. 1990 Census reports the county's mode split for work trips as 74% SOV, 12% HOV, 9% transit, and 5% by non-motorized modes. These figures apply to peak hour travel, and cannot be compared to the all day data reported in the table for this Indicator.

Indicator #44 **Ability of goods and services to move efficiently and cost effectively through the region.**

- At all three King County sites investigated: SR 18 at Auburn, I-5 at 185th St., and SR 522 at Woodinville, truck traffic has increased substantially between 1993 and 1998. During this time, average daily truck traffic has expanded at an average annual rate of 9.8% at the Auburn SR 18 site, of 5.5% at the I-5 site, and of 8.2% at the Woodinville SR 522 site.
- The growth rate of truck traffic has far outpaced that of autos, from 2 times the growth rate of auto traffic on SR 18 to 5 times the growth rate of autos on SR 522.

Indicator #45 **Number of lane miles of city, county, and state roads and bridges in need of repair and preservation**.

- The total countywide lane miles in need of repair and preservation is 3,841.

III. Discussion

The county's transportation system is inextricably linked to its growth and development. This linkage means that growth trends may be evaluated through transportation system performance. Policy-based investments in the transportation system should produce and reinforce the desired development patterns. The Countywide Planning Policies call for a more compact, dense pattern of development that can be served efficiently and effectively with transportation investments, and which maximizes the use of existing transit services and road facilities.

The trends reported here have all been apparent for the last several years, before the Countywide Planning Policies were adopted. The CPPs goals and policies have not necessarily affected recent growth and development that is just now producing increased travel demand. As transportation and growth policies influence future development, the Indicator trends should show a decrease in the rate of growth of vehicle miles of travel, and an increase in per capita transit usage. While growth and transportation are linked closely, the location and density of growth, and the mode and trip length of urban travel have complex relationships that can only be explained by intricate traffic models.

The influence of transportation investments on the transportation Indicators will take some time to be recognized, since much of the current investment was programmed before the Countywide Planning Policies were adopted.

VMT and Air Quality

Environment Indicator #12, *Vehicle miles traveled per capita per year*, is closely related to the Transportation Indicators. VMT per person increased 48% from 1985 to1998. The increase is due to a combination of factors, including population and employment growth, lower density suburban development, increased propensity to travel, and stable gasoline prices. The result has been more vehicles on the road traveling more miles per capita.

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Motor vehicles are the major source of carbon monoxide and hydrocarbon air pollutants. The VMT Indicator is used in the Environment section of the Benchmark Report to help monitor air quality. Although King County's per capita VMT is still increasing, regional air quality has improved with respect to the parameters identified in federal air quality standards. The regulation of auto emissions has been the primary contributor to improved air quality. Factors such as auto fuel efficiency and the availability of oxygenated gasoline in the wintertime also contribute to air quality improvement.

Commute Times

Available information indicates that the percent of residents who commute one way within thirty minutes is around 80%, and has changed little since 1989. The figures are taken from the Puget Sound Transportation Panel Survey (PSTPS) conducted by the Puget Sound Regional Council, the only annual source of information for this Indicator. The PSTPS is a longitudinal survey, which takes twice-yearly travel surveys from the same households. The survey methodology does not fully account for new growth. The result of this procedure is an overly-stable Indicator, which is only partially representative of new household growth in suburban King County. Future work for this Indicator will include finding a data source that describes the transportation characteristics of new growth as well as the present population.

Transit Ridership

Transit ridership dipped from 1990 - 1994, but has risen steadily from 1994 - 1997. It is generally keeping pace with population growth in the county. Transit ridership is a function of several regional variables, including fuel prices, unemployment, transit fare changes, suburban employment growth, and public perception of transit service and traffic congestion. The smaller trends within the data may be explained by regional economic performance or fluctuations in fuel prices.

IV. General Information about Indicators and Data Sources

The transportation Indicators are based on data that are as reliable and consistent as possible within their limitations. Work in future years will attempt to improve and expand on data sources, and to provide more comparative information. As an example, the Commute Trip Reduction report from the State Energy Office contains valuable insight on SOV (single occupant vehicle) and VMT (vehicle miles traveled) reductions at major employment sites in the county.

Two Indicators that are currently not part of the Benchmark Report may provide valuable insight to transportation and land use development in the county: *Transportation Concurrency Approvals* and *Traffic Congestion*. The Growth Management Act requires jurisdictions to develop concurrency programs which maintain level of service standards for transportation and mobility. Transportation congestion is highly visible and readily experienced, and is easily related to transportation measures. Each can be quantified and reported on a yearly basis, and each is significant to the performance of the transportation system as it serves land use.

V. Definition of Terms

- ***HOV** is a high occupancy vehicle such as a van or carpool.*
- ***Mode** is the means of transportation, such as transit, walking or bicycling.*

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- ***Mode split*** *describes the number or proportion of people using each transportation mode.*
- ***Non-Motorized*** *types of transportation include walking and bicycling.*
- ***SOV*** *is a single occupant vehicle.*
- ***Transit ridership****, or transit trips per person, is expressed as the average number of transit trips per person per year. The figure is calculated by dividing the total number of trips by the total County population.*
- ***VMT*** *is vehicle miles traveled. See Environment Indicator #12 for more information.*

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Outcome: *Enhance Transportation and Land Use Linkages*

INDICATOR 41: Percent of residents who commute one-way within 30 minutes.

Percent of County Residents whose Daily One Way Commute is less than 30 Minutes, more than 30 Minutes and to more than One Workplace									
Year	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995***	**1996**	**1997**
Less than 30 minutes	**80%**	**79%**	**NA**	**81%**	**83%**	**78%**	**NA**	**82%**	**79%**
More than 30 minutes	17%	19%	NA	17%	15%	17%	NA	12%	17%
More than one work place	3%	2%	NA	2%	2%	5%	NA	4%	4%

Definitions:

- *These figures are taken from the Puget Sound Transportation Panel Survey (PSTPS) conducted by the Puget Sound Regional Council. This is the only annual source of information for this Indicator. The sample of King County households (about 800) which provided the data represents a stable sample of county residents that changed only slightly over the survey period. The PSTPS is a longitudinal survey, which takes twice-yearly travel surveys from the same households. These are selected and stratified to include higher-than-random numbers of families that use transit and carpools. The survey information only partly accounts for new growth in the county, since the same households have been used each year, allowing only for replacement of drop-out households. The result of this procedure is to show an overly-stable Indicator, which is partially representative of new household growth in suburban King County.*

Observations:

- About 80% of Puget Sound commuters travel less than thirty minutes to or from work.
- There has been little change in the commute time since 1989, suggesting that travel conditions have not changed substantially since then. Because commute times have not yet reached extremes, residential location will not be greatly affected by transportation conditions.

Data Source: *Puget Sound Transportation Panel Survey*, 1984-1997, Puget Sound Regional Council.

Policy Rationale: The policy rationale stems from Countywide Planning Policies T-1 and T-4. This Indicator measures accessibility. The proximity of households to employment means more travel options are available, and fewer vehicle miles will be traveled.

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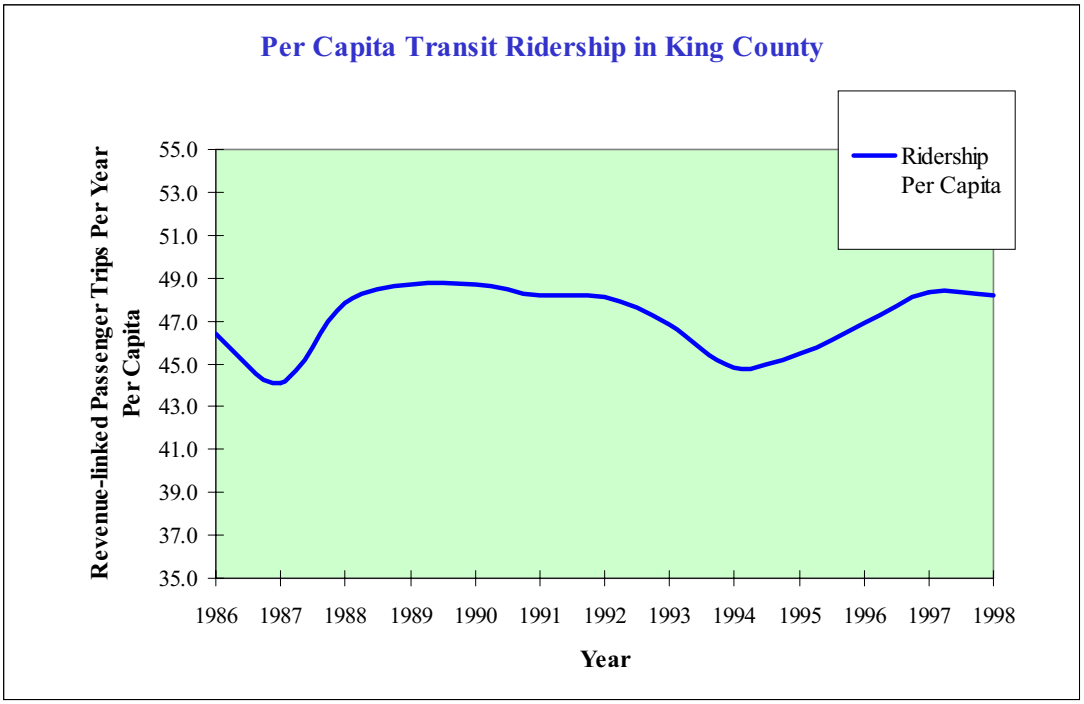
Outcome: *Increase the Availability of Modes Other Than Single Occupant Vehicle.*

INDICATOR 42: Transit trips per person.

Metro Transit Ridership Per Capita												
1986	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
46.4	44.1	47.8	48.7	48.7	48.2	48.1	46.8	44.8	45.5	46.9	48.3	48.2



Definitions:

- *Ridership for 1986-1998 is based on annual operating statistics of revenue-linked passengers trips. Ride Free Area ridership figures were updated in 1988 and after. These add about 5.5 million non-revenue trips to the annual revenue-linked ridership figures.*

Observations:

- This indicator has fluctuated over the last ten years, with per capita ridership reaching a high in 1989, and a low in 1994. It increased again from 1994 to 1997, but leveled off in 1998. The 1998 figure is calculated from an annual ridership of 80,269,178, and a population of 1,665,800.
- Because of the overall stability, the transit system may be serving the same riders over the last ten years, with the same market response.

INDICATOR 42:

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- Transit ridership is a function of several regional variables, among them fuel prices, regional unemployment, transit fare changes, suburban employment growth, and public perception of transit service and traffic congestion. The ridership figures in 1996 to 1998 show the effect of the Six Year Plan which began implementation in the fall of 1996.
- While ridership per capita has fluctuated, population and vehicle miles traveled have increased significantly. During the 10 year period from 1989 - 1998, King County population increased by 15.2% and transit miles traveled increased by 20.5%.

Data Source: *Metro Transit General Manager's Quarterly Management Report*, Metro Transit Division, 4th Quarter, 1995, 1997, 1998, and lst Quarter 1999. The ridership figures are derived from a sampling of transit ridership during the year; the population figures are consistent with those in the *King County Annual Growth Report.*

Policy Rationale: The policy rationale stems from Countywide Planning Policies FW-18, T-1, T-5, and T-14. Transit demand management plays an important role in the development of key strategies for serving future growth. Transit use affects mode split, air quality, vehicle miles traveled, and traffic congestion. It is a significant part of a multi-modal system.

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Outcome: *Assess the Mode Split*

INDICATOR 43: Percent of residents who walk or use transit, bicycles or carpools as alternatives to the single occupant vehicle.

Percent of County Residents Who Travel by Means other than a Single Occupancy Vehicle									
	1989	**1990**	**1991**	**1992**	**1993**	**1994**	**1995***	**1996**	**1997**
Transit	3.2%	3.6%	NA	3.9%	4.1%	3.7%	NA	3.8%	5.7%
HOV/ Carpool	36.6%	33.4%	NA	35.3%	34.3%	35.8%	NA	33.8%	33.0%
Non-Motorized/ Other	4.9%	5.8%	NA	5.8%	7.3%	6.3%	NA	6.9%	6.9%
SOV	54.4%	56.3%	NA	54.4%	53.6%	53.7%	NA	55.4%	54.4%

Notes:

1. HOV = High Occupancy Vehicle (van or carpool); Non-Motorized = Bicycle, Pedestrian; SOV = Single Occupant Vehicle. The numbers for 1997 are unweighted, so that the transit and HOV numbers may be overstated. The actual share of transit may be closer to 4 - 4.5%.
2. No data was collected in 1995.

Definitions:

- *Percent distributions for each transportation mode were computed using the Puget Sound Transportation Panel Survey (PSTPS). For each of the seven years of PSTPS panel members were categorized by county of residence and by primary mode to work. The trip modes for each year were grouped accordingly: Single Occupancy Vehicles (SOV), High Occupancy Vehicles (including carpool, vanpool, and drive-on ferry), Transit (including bus, paratransit, walk-on ferry, and monorail), Non-Motorized (including walk and bicycle) and Other (including taxi, motorcycle, school bus, boat, plane, and train).*
- *These data are derived from the PSRC's Puget Sound Transportation Panel Survey, the same as for Indicator # 41. The same limitations apply, namely that the use of a constant panel over several years does not reflect growth trends adequately, and the data may show more stability than is actually the case.*

Observations:

- The table shows that about one third of daily household travel is made by high occupancy vehicle, and one half by single occupant vehicle. The remainder is by transit or non-motorized modes.
- The Washington State Energy Office's Report concludes that some trip reduction to work occurs because of telecommuting. In the 435 King County sites surveyed for 1995, the reduction in average daily person trips because of telecommuting was 280.
- The PSTPS does not measure travel at peak commute hours of the day. This is the time traffic is most congested and therefore most important to track In the future this report may use data from the Washington State Energy Office's Commute Trip Reduction Program to track the use of alternative travel modes for commuting to work.
- The high proportion of trips using the HOV mode (33.0% in 1997) is characteristic of daily travel. Looking at all trips, family members frequently accompany the adult driver on shopping, recreation, and other trip types. Peak hour HOV usage is approximately 20% of all person trips.

INDICATOR 43:

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Observations: (continued)

- The U. S. 1990 Census reports the county's mode split for work trips as 74% SOV, 12% HOV, 9% transit, and 5% by non-motorized modes. These figures apply to peak hour travel, not to the all-day data reported in the table above.
- Transit usage on a daily basis is about 4 - 5% of total travel, roughly the same as the regional peak hour mode split.

Data Source: *Puget Sound Transportation Panel Survey* (PSTPS) 1984 -1997, The Puget Sound Regional Council. Seattle, WA. *Initial Impacts, Benefits, and Costs of Washington's Commute Trip Reduction Program.* Washington State Energy Office.

Policy Rationale: : The policy rationale stems from Countywide Planning Policies FW-18, FW-19, T-1, T-7, T-8 and T-12. The CPPs encourage the development of an effective multi-modal transportation system that supports the use of modes other than the single occupant vehicle. Telecommuting is not counted as a mode of travel, but it may be tracked in the future as a factor in reducing commute trips.

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Outcome: *Reduce Commercial Traffic Congestion*

INDICATOR 44: Ability of goods and services to move efficiently and cost effectively through the region.

A. Average Daily Traffic: Auto and Truck

Average Daily Traffic SR 18 at Auburn, West Bound - 1993 - 1998							
	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**Annual Average Change**
Trucks	1,241	1,400	1,720	1,640	1,818	1,981	9.8%
Cars/Vans/Busses	15,388	15,729	16,431	16,653	17,670	19,028	4.3%
Total vehicles	16,630	17,129	18,150	18,293	19,488	21,008	4.8%
Trucks as % of Total	8%	8%	10%	9%	9%	9%	

Average Daily Traffic for I-5 at 185th North Bound - 1993 - 1998							
	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**Annual Average Change**
Trucks	3,080	3,578	3,387	3,452	3,743	4,016	5.5%
Cars, Vans, Pickups	79,796	79,405	85,724	79,489	84,942	86,899	1.7%
Total	82,876	82,983	89,111	82,941	88,685	90,915	1.9%
Trucks as % of Total	3.7%	4.3%	3.8%	4.2%	4.2%	4.4%	

Average Daily Traffic for SR 522 at Woodinville, West Bound - 1993 - 1998							
	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**Annual Average Change**
Trucks	996	1,102	1,111	1,322	1,476	1,478	8.2%
Cars/Vans/Busses	14,977	15,368	14,230	16,034	16,022	16,180	1.6%
Total vehicles	15,972	16,470	15,341	17,356	17,497	17,658	2.0%
Trucks as % of Total	6.2%	6.7%	7.2%	7.6%	8.4%	8.4%	

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INDICATOR 44:
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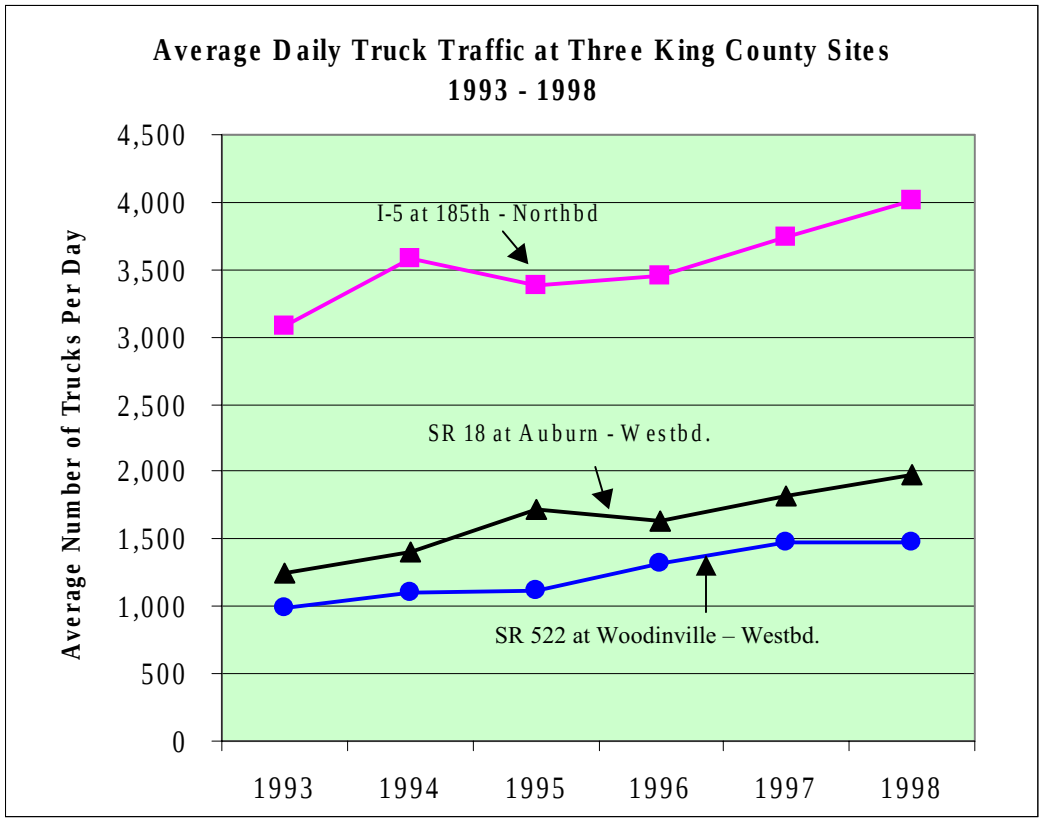
Definitions:

- *Annual average daily traffic is obtained by dividing the total annual vehicle counts by the number of days that counts were made. Vehicle counts by thirteen different axle types are collected by the Washington Department of Transportation at 62 weight-in-motion sites on state highways throughout Washington State.*
- *Data is available for seven sites in King County. Data from three of those sites is presented here. No data is available for I-405, since counters have not been installed along the route.*

Observations:

- At all three King County sites investigated, I-5 at 185th St., SR 18 at Auburn, and SR 522 at Woodinville, truck traffic has increased substantially between 1993 and 1998. During this time, average daily truck traffic has expanded at an average annual rate of 9.8% at the Auburn SR 18 site, by 5.5% at the I-5 site, and by 8.2% at the Woodinville SR 522 site.
- The growth rate of truck traffic has far outpaced that of autos, from 2 times the growth rate of autos on SR 18 to 5 times the growth rate on SR 522.
- Since truck traffic is growing faster than auto traffic, trucks represent a greater share of total traffic than they did several years ago. By 1997, trucks constituted 4.4% of the traffic at the I-5 site, 9.4% on SR 18 and 8.4% on SR 522.



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B. Volume to Capacity Ratios

Definitions

- *AM and PM refer to the morning and afternoon peak periods. NB and SB indicates traffic heading northbound and southbound respectively, while EB and WB refer to eastbound and westbound traffic.*
- *The volume-to-capacity ratio (v/c) is a standard measure of roadway level of service.*
- *A roadway link with a v/c ratio of between .75 and .90 is characterized by declining speeds (due to traffic flow increases), constricted maneuverability and queuing. A v/c of .9-1.0 means there are no usable gaps in the traffic stream, maneuverability is extremely limited and frequent traffic disruptions occur.*
- *A volume-to-capacity ratio of .9 and above for a roadway segment means that it is capacity deficient.*

Observations

- As truck and auto traffic increase, volumes are approaching or exceeding roadway capacity. In 1995, volumes on I-5 from NE 145 St. to 44th Ave W. were over capacity for the morning peak periods southbound and the evening peak northbound. In 1997 the evening peak period was over capacity in both directions. The morning southbound traffic had improved slightly, but is still near to capacity.
- In 1995 roadway segments on SR 522 from N. 145th to 68th Ave NE were well over capacity southbound in the morning and northbound in the evening. Traffic in the opposite direction was also approaching capacity. On SR 18 from SE 312th to the Auburn – Black Diamond Road, northbound traffic in the evening was over capacity at a 1.0 v/c ratio. 1997 data is not available for these site.
- With continued economic development truck and auto traffic are likely to expand over 1997 levels. At the same time, volume-to-capacity ratios continue to deteriorate from 1995 levels, since little capacity has been added to the transportation system.
- As traffic volumes grow and capacity remains constant, congestion results. The greater the roadway congestion, the more time it takes to move goods. This results in the increased cost of transporting freight by truck through King County.

Data Source: The data used to derive annual average daily traffic (ADT) was obtained from the Transportation Data Office of the Washington Department of Transportation (WDOT). The data on volume to capacity ratios was obtained from the publication "Construction Management System: Baseline Performance Report, published in 1998 by the Puget Sound Regional Council and the Council's Web Site. 1997 is from the forthcoming 1999 edition of this report, published by PSRC.

Policy Rationale: The policy rationale stems from the Countywide Planing policies FW-20 and T-1. Freight and good movement are critical to the economy and health of the region Consideration should be given to enhancing mobility for freight and goods movement. Action which only improves commuting accessibility may not adequately address freight and goods movement.

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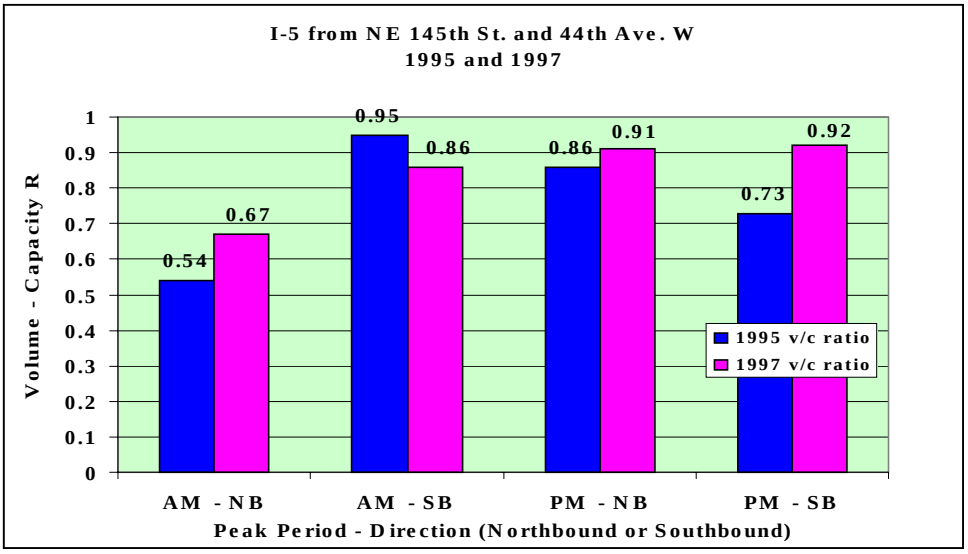

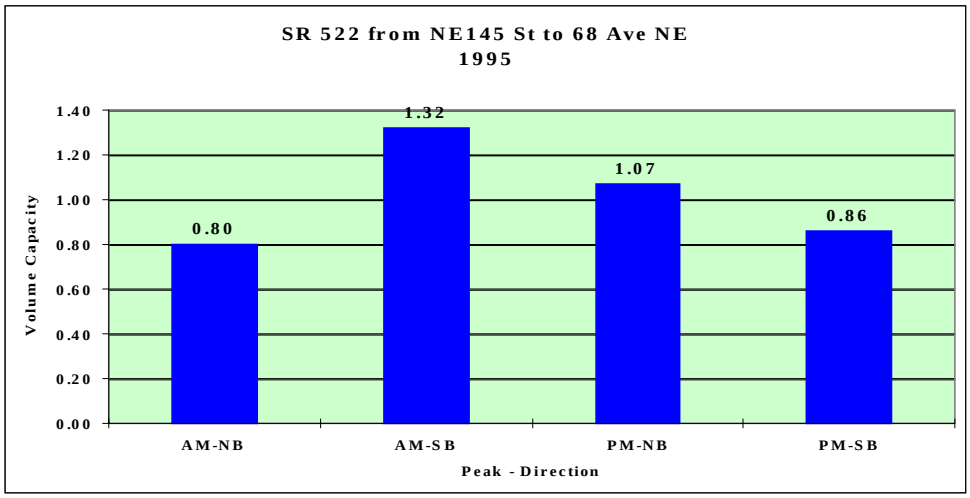

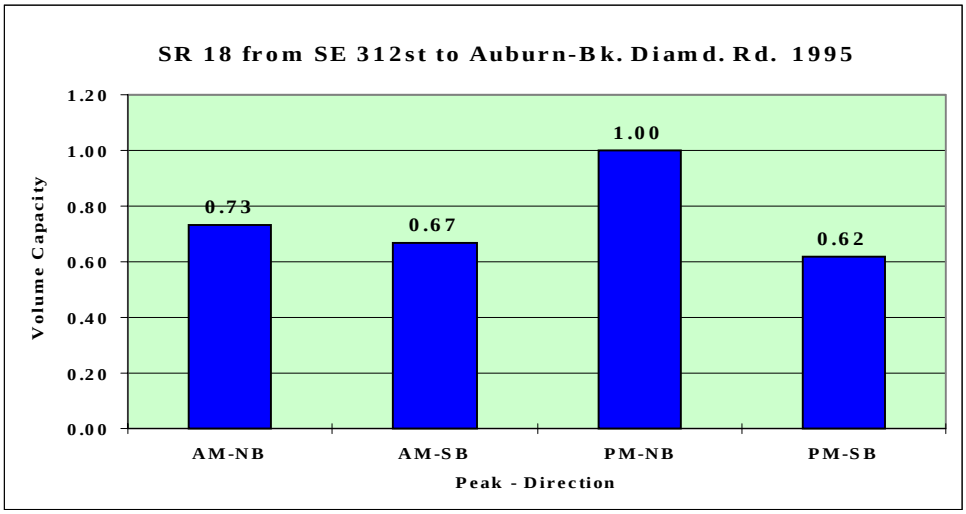

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Outcome: *Protect and Improve Transportation Infrastructure*

INDICATOR 45: Number of lane miles of city, county and state roads and bridges in need of repair and preservation.

Number of Lane Miles In Need of Repair and Preservation	
Total Lane Miles Needing Repair in 1998	3,841

Definitions:

- *There are three basic operations that agencies undertake on their roads**: maintenance, rehabilitation,** and **reconstruction**. Maintenance refers to routine procedures such as crack sealing, patching, and pre-leveling (or skin patching) which needs to be done on all roadways every 2 - 6 years (see table below). Rehabilitation ordinarily involves repaving of a road segment. This needs to be done about every 12 years on arterials and approximately every 25 years on residential streets. Reconstruction refers to the major rebuilding of a roadway.*
- *As used in the table above, the terms "**repair"** and **"preservation**" are loosely defined. In most cases they refer to the number of lane miles in need of any of the three types of operations **in the near future (one to two-years).** Because they have not yet been precisely defined, there may be considerable variation in the number of lane miles each city considers in need of "repair" or "preservation". The numbers above and in the background table should be taken as broad estimates.*
- *Roads are generally divided into **arterials, collectors, and residential streets**. They may be further classified as urban or rural. Generally, arterials (because they carry the most traffic) will need maintenance and rehabilitation more often than residential streets.*
- *There are three types of paved roadways: **asphalt, bituminous-treated (BST)** and **Portland Cement Concrete**. BST is generally not used on arterial or collector pavements. Other than in Seattle, there will be very few, if any, Portland Cement Concrete pavements. Asphalt is most common.*
- ***Centerline miles** refers to the number of miles along the "center line" of a road regardless of the number of lanes it contains. It is used to estimate the total amount of roadway in a jurisdiction. **Lane miles** refers to the total length of all lanes under consideration. Thus a four lane road of two "centerline" miles would amount to eight lane miles. Repair and construction costs are generally estimated in lane miles. An average for most cities would be approximately 2.3 lane miles per centerline mile.*

Observations:

- As reported by the cities, the county, and the state approximately 3,841 lane miles of roads in King County will require maintenance, rehabilitation, or reconstruction in the next few years.
- It is difficult to estimate the actual cost of road repair per lane mile since there are so many variables to consider. However, the chart below gives some approximate costs per square yard and per lane mile depending on whether the segment is an arterial or residential street. For instance, rehabilitating (repaving) an asphalt arterial would cost approximately $42,000 per lane mile. The costs are for the in-place materials and do not reflect any improvements or overhead.

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	Routine Maint.	Rehab-asphalt	Rehab-BST	Rehab PCC**	Reconst Asphalt	Reonst BST	Reconst PCC
Unit Cost – Arterial / yd^2	$0.75	$6.00	$2.50	-	$20.00	$5.00	$60.0
Unit Cost – Residential	$0.50	$5.00	$1.25*	-	$15.00	$4.00*	$50.0
Lane Mile Cost – Arterial	$5,280	$42,000	$17,600	-	$140,000	$35,200	$4,224
Lane Mile Cost – Residential	$3,227	$32,300	$8,067	-	$96,800	$25,800	$3,226
Average Expected Life – Arterial	2-4	12	8	12-30	15-20	7-8	30
Average Expected Life – Residential	4-6	27	10	20-50	25-30	8-15	50

Date Source: Cities Benchmark Data; King County Transportation Planning, Washington State Department of Transportation. Derald Christensen, Measurement Research Corporation, Gig Harbor, WA.

Policy Rationale: : The policy rationale stems from Countywide Planning Policies FW-20 - FW-23 and T-8. This Indicator attempts to measure our ability to protect and preserve our existing infrastructure, and to eliminate, lessen or defer the need to invest in new facilities.

Metropolitan King County *Countywide Planning Policies* Benchmark Program

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Indicator #45 Background Information

	Total Centerline Miles of Road	Typical Number of Lane Miles of Repair Estimated Per Year*	Lane Miles in Need of Repair in 1998
Algona	na	na	na
Auburn	150	20.7	185
Beaux Arts	1.5	0.2	na
Black Diamond	na	na	na
Bellevue	366	50.5	60
Bothell	na	na	na
Burien	113	15.6	35.8
Carnation	9.3	1.3	1.2
Clyde Hill	na	na	na
Covington	na	na	na
Des Moines	85.2	11.8	18.6
Duvall	na	na	na
Enumclaw	27.6	3.8	12
Federal Way	227.3	31.4	49
Hunts Point	na	na	na
Issaquah	46	6.3	21
Kenmore	na	na	na
Kent	211	29.1	20
Kirkland	139	19.2	12
Lake Forest Park	na	na	na
Medina	na	na	na
Mercer Island	85	11.7	100
Milton	0.3	0.0	0.3
Maple Valley	na	na	na
North Bend	23.4	3.2	23.5
Newcastle	na	na	na
Normandy Park	26.7	3.7	53.4
Pacific	na	na	na
Redmond	128.8	17.8	85
Renton	53.8	7.4	113.8
Seattle	1665	229.8	2337
Shoreline	196	27.0	na
Skykomish	3.2	0.4	6.5
Snoqualmie	na	na	na
SeaTac	129.1	17.8	11
Tukwila	53.8	7.4	114
Woodinville	42.9	5.9	2.2
Yarrow Point	na	na	na
Unincorp. KC	2048	282.6	180
State	785	108.3	400
Total	**6617**	**913.1**	**3841**

*This "typical" amount of lane miles that would need repair in a given year is based on the following formula: 6% of centerline miles x 2.3 lane miles per centerline mile or 0.06 x Centerlane Miles x 2.3 = lane miles in need of repair each year. This assumes that maintenance and rehabilitation is being done regularly, and has not been deferred for a number of years. The actual lane miles in need of repair often reflects years of deferred maintenance.

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Indicator #45 Background Information (cont.)

Notes about table on preceding page:

- In addition to 400 lane miles of road resurfacing/maintenance in King County, the State of Washington undertakes many projects such as bridge repair and painting, which cannot be measured in lane miles. These are not included in the table. For the Northwest District, which includes King, Snohomish, Skagit, and Whatcom counties, these projects were estimated to cost 13.5 million during the 1998-1999 biennium, and 50.5 million over the next six years. About two-thirds of these projects are in King County.

Budgeting for Road Repair and Preservation

A 1997 survey of approximately 20 jurisdictions in Washington State asked for the total centerline miles maintained by the jurisdiction, and its annual roads budget. Dividing the total budget by the number of centerline miles yields the amount of budgeted dollars per mile of roadway. As the table below shows, for 7 participating cities in King County, the total budgeted dollars divided by the total centerline miles gives a per mile budget in the neighborhood of $4000. Other sources confirm that a yearly budget of approximately $4500 - $5000 per centerline mile of roadway is reasonable for most jurisdictions. However, there is considerable variation among jurisdictions depending on the current condition of roads and on the overhead costs in the city. Some cities may include more overhead costs in their calculations and hence have a considerably higher figure per mile.

Comparison of Budgets for City Streets and Roads among selected King County Cities

City	Total Centerline Miles	Total Roads Budget for City	Budgeted Dollars/Mile
Federal Way	205	$ 925,000	$ 4,512
Issaquah	47	$ 250,000	$ 5,319
Kirkland	135	$ 800,000	$ 5,926
Redmond	117	$ 400,000	$ 3,419
Renton	149	$ 650,000	$ 4,362
Seattle	1665	$ 6,210,000	$ 3,730
Total for these Cities	2318	$ 9,235,000	**$ 3,984**

Another method of estimating the costs of road maintenance and rehabilitation is to assume that approximately 3 - 8% of a jurisdiction's centerline miles of road will need attention each year. For a city such as Federal Way, which budgeted about $4500 per centerline mile per year, the total budget of $925,000 is roughly equal to the cost of repaving 5% of the lane miles with asphalt. (i.e. 5% of 205 centerline miles equals 23.5 lane miles in need of repaving at a cost of $42,000 per arterial lane mile. This amounts to $990,000). However, in actuality, of the 5% of the lane miles in need of attention, some will be at a lower cost (maintenance) and some at a higher cost (reconstruction).

In future years, a more precise definition of "lane miles in need of repair" will yield more consistent numbers from the jurisdictions and their projected annual roads budget.

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